TRICHINOSIS

DISEASE REPORTING

In Washington

DOH receives 0 to 1 reports of trichinosis per year. Wild game from out of state is a commonly reported exposure in Washington cases.

Purpose of reporting and surveillance

- To identify sources of transmission (e.g., contaminated meat) and to prevent further transmission from such sources.
- To educate exposed persons about signs and symptoms of disease, thereby facilitating early diagnosis.
- When the source of infection appears to pose a risk of only a few individuals (e.g., wild animal meat), to inform those individuals how they can reduce their risk of exposure.

Reporting requirements

- Health care providers: notifiable to Local Health Jurisdiction within 3 work days
- Hospitals: notifiable to Local Health Jurisdiction within 3 work days
- Laboratories: no requirements for reporting
- Local health jurisdictions: notifiable to DOH Communicable Disease Epidemiology within 7 days of case investigation completion or summary information required within 21 days

CASE DEFINITION FOR SURVEILLANCE

Clinical criteria for diagnosis

A disease caused by ingestion of *Trichinella* larvae. The disease has variable clinical manifestations. Common signs and symptoms among symptomatic persons include eosinophilia, fever, myalgia, and periorbital edema.

Laboratory criteria for diagnosis

- Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy, or
- Positive serologic test for *Trichinella*.

Case definition

- Confirmed: a clinically compatible case that is laboratory confirmed.
  In an outbreak setting, at least one case must be laboratory confirmed. Associated cases should be reported as confirmed if the patient shared an epidemiologically implicated meal or ate an epidemiologically implicated meat product and has either a positive serologic test for trichinosis or a clinically compatible illness.

A. DESCRIPTION

1. Identification

A disease caused by an intestinal roundworm whose larvae (trichinae) migrate to and become encapsulated in the muscles. Clinical illness in humans is highly variable and can range from inapparent infection to a fulminating, fatal disease, depending on the number of larvae ingested. Sudden appearance of muscle soreness and pain together with edema of the upper eyelids and fever are early characteristic signs. These are sometimes followed by subconjunctival, subungual and retinal hemorrhages, pain and photophobia. Thirst, profuse sweating, chills, weakness, prostration and rapidly increasing eosinophilia may follow shortly after the ocular signs.

Gastrointestinal symptoms, such as diarrhea, due to the intraintestinal activity of the adult worms, may precede the ocular manifestations. Remittent fever is usual, sometimes as high as 40°C (104°F); the fever terminates after 1-6 weeks, depending on intensity of infection. Cardiac and neurologic complications may appear in the 3rd to 6th week; in the most severe cases, death due to myocardial failure may occur in either the 1st to 2nd week or between the 4th and 8th weeks.

Serologic tests and marked eosinophilia may aid in diagnosis. Biopsy of skeletal muscle, taken more than 10 days after infection (most often positive after the 4th or 5th week of infection), frequently provides conclusive evidence of infection by demonstrating the uncalcified parasite cyst.

2. Infectious Agent

Trichinella spiralis, an intestinal nematode. Separate taxonomic designations have been accepted for isolates found in the Arctic (*T. nativa*), Palaearctic (*T. britovi*), in Africa (*T. nelsoni*) and in several regions of the world (*T. pseudospiralis*).

3. Worldwide Occurrence

Worldwide, but variable in incidence, depending in part on practices of eating and preparing pork or wild animal meat and the extent to which the disease is recognized and reported. Cases usually are sporadic and outbreaks localized, often resulting from eating sausage and other meat products using pork or shared meat from Arctic mammals. Several outbreaks in France and Italy due to infected horse meat have been reported.

4. Reservoir

Swine, dogs, cats, horses, rats and many wild animals, including fox, wolf, bear, polar bear, wild boar and marine mammals in the Arctic, and hyena, jackal, lion and leopard in the tropics.

5. Mode of Transmission

By eating raw or insufficiently cooked flesh of animals containing viable encysted larvae, chiefly pork and pork products, and beef products, such as hamburger adulterated either intentionally or inadvertently with raw pork. In the epithelium of the small intestine, larvae develop into adults. Gravid female worms then produce larvae, which penetrate the lymphatics or venules and are disseminated via the bloodstream throughout the body. The larvae become encapsulated in skeletal muscle.

6. Incubation period

Systemic symptoms usually appear about 8-15 days after ingestion of infected meat; varies between 5 and 45 days depending on the number of parasites involved. GI symptoms may appear within a few days.

7. Period of communicability

Not transmitted directly from person to person. Animal hosts remain infective for months, and meat from such animals stays infective for appreciable periods unless cooked, frozen or irradiated to kill the larvae (see B1, below).

8. Susceptibility and resistance

Susceptibility is universal. Infection results in partial immunity.

B. METHODS OF CONTROL

1. Preventive measures:

a. Educate the public on the need to cook all fresh pork and pork products and meat from wild animals at a temperature and for a time sufficient to allow all parts to reach at least 71ºC (160ºF), or until meat changes from pink to grey, which allows a sufficient margin of safety. This should be done unless it has been established that these meat products have been processed either by heating, curing, freezing or irradiation adequate to kill trichinae.
b. Grind pork in a separate grinder or clean the grinder thoroughly before and after processing other meats.

c. Adopt regulations to encourage commercial irradiation processing of pork products. Testing carcasses for infection with a digestion technique is useful. Immunodiagnosis of pigs with an approved ELISA test is also useful.
d. Adopt and enforce regulations that allow only certified trichinae free pork to be used in raw pork products that have a cooked appearance or in products that traditionally are not heated sufficiently to kill trichinae during final preparation.
e. Adopt laws and regulations to require and enforce the cooking of garbage and offal before feeding to swine.
f. Educate hunters to cook thoroughly the meat of walrus, seal, wild boar, bear and other wild animals.
g. Freezing temperatures maintained throughout the mass of the infected meat are effective in inactivating trichinae i.e., holding pieces of pork up to 15 cm thick at a temperature of -15ºC (5ºF) for 30 days or -25ºC (-13ºF) or lower for 10 days will effectively destroy all common types of trichinae cysts. Hold thicker pieces at the lower temperature for at least 20 days. These temperatures will not inactivate the cold-resistant Arctic strains (*T. nativa*) found in walrus and bear meat and rarely in swine.
h. Exposure of pork cuts or carcasses to low-level gamma irradiation effectively sterilizes and, at higher doses, kills trichinae encysted larvae.

2. Control of patient, contacts and the immediate environment:

a. Report to local health authority.
b. Isolation: None.
c. Concurrent disinfection: None.
d. Quarantine: None.
e. Immunization of contacts: None.
f. Investigation of contacts and source of infection: Check other family members and persons who have eaten meat suspected as the source of infection. Confiscate any remaining suspected food.
g. Specific treatment: Albendazole (Zentel) or mebendazole (Vermox) are effective in the intestinal stage and in the muscular stage. Corticosteroids are indicated only in severe cases to alleviate symptoms of the inflammatory reaction when the CNS or heart is involved; however, they delay elimination of the adult worms from the intestine. In rare situations in which known infected meat has been consumed, prompt administration of antihelminthic treatment may prevent development of symptoms.

3. Epidemic measures

Epidemic measures: Institute epidemiologic study to determine the common food involved. Confiscate remainder of suspected food and correct faulty practices. Eliminate infected swine herds.

4. International measures

WHO Collaborating Centres.